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October 19, 2007

Date of Signature

Our Case No. 9281/4793  
Client Ref. No. CK US98034

### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: )  
Akira NAKANO et al. )  
Serial No. 10/786,914 ) Examiner: Alejandro Mulero, Luz L.  
Filing Date: 02/25/2004 ) Group Art Unit No. 1792  
For: PLASMA TREATMENT EQUIPMENT ) Confirmation No. 2084

### AMENDMENT

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This Amendment is submitted in response to the Final Office Action dated  
**June 20, 2007**. Please amend the application as follows and consider the remarks  
herein.

**Amendments to the Claims** begin on page 2 of this paper.

**Remarks** begin on page 8 of this paper.

### **AMENDMENT TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application.

#### **LISTING OF CLAIMS**

1. (Amended) A plasma treatment equipment having a chamber for performing plasma treatment, the plasma treatment equipment comprising:  
a plasma excitation electrode to which a power for plasma excitation is supplied, the plasma excitation electrode being provided in the chamber; and  
a susceptor electrode that is opposed to the plasma excitation electrode provided in the chamber, the susceptor electrode having the same DC potential as that of a chamber wall of the chamber, the susceptor electrode being an electrode into which a high frequency electric current based on the power for plasma excitation flows after passing through a plasma space;  
wherein the chamber wall of the chamber and the susceptor electrode are AC shorted to each other [Plasma treatment equipment in which a chamber wall and a susceptor electrode having the same DC potential are AC shorted to each other].
5. (Amended) The plasma treatment equipment according to claim [3] 4, wherein the said metal plate is inclined with respect to the bottom wall, and an angle formed between said metal plate and the bottom wall is less than 45 degrees.
13. (Amended) A plasma treatment equipment having a chamber for performing plasma treatment, the plasma treatment equipment comprising:  
a plasma excitation electrode to which a power for plasma excitation is supplied, the plasma excitation electrode being provided in the chamber;  
a susceptor electrode that is opposed to the plasma excitation electrode provided in the chamber; and

an electrode shield of the susceptor electrode provided in the chamber,  
wherein at least one of the susceptor electrode and the electrode shield  
thereof has the same DC potential as that of a chamber wall of the chamber,  
the susceptor electrode being an electrode into which a high frequency  
electric current based on the power for plasma excitation flows after passing through  
a plasma space, and  
the chamber wall of the chamber and at least one of the susceptor electrode  
and the electrode shield thereof are AC shorted to each other.

14. (Amended) The plasma treatment equipment according to claim 13,  
wherein the electrode shield of the susceptor electrode has the same DC potential  
as that of the chamber wall of the chamber, and the chamber wall of the chamber  
and the electrode shield of the susceptor electrode are AC shorted to each other.

15. (Previously Presented) The plasma treatment equipment according  
to claim 14, wherein said chamber wall and said electrode shield are shorted to each  
other at a location that is within a distance shorter than 500 mm from a side wall of  
the chamber wall.

16. (Previously Presented) The plasma treatment equipment according  
to claim 15, wherein said electrode shield is shorted to said chamber wall at a short  
point on a bottom wall of the chamber wall, said short point being located within a  
distance shorter than 500 mm from a side wall of the chamber wall as measured  
along the bottom wall.

17. (Previously Presented) The plasma treatment equipment according  
to claim 14, wherein said chamber wall and said electrode shield are shorted at a  
plurality of short points.

18. (Previously Presented) The plasma treatment equipment according to claim 17, wherein the plurality of short points are disposed approximately symmetrically with respect to a center of said electrode shield.

19. (Previously Presented) The plasma treatment equipment according to claim 14, wherein said electrode shield is shorted to a side wall of the chamber wall.

20. (Previously Presented) The plasma treatment equipment according to claim 16, wherein said electrode shield is shorted to said chamber wall by a metal plate, said metal plate being connected between the short point on the bottom wall and a second short point on the electrode shield.

21. (Previously Presented) The plasma treatment equipment according to claim 20, wherein said metal plate is inclined with respect to the bottom wall, and an angle formed between said metal plate and the bottom wall is less than 45 degrees.

22. (Previously Presented) The plasma treatment equipment according to claim 13, wherein the at least one of the electrode and the electrode shield being at the same DC potential as the chamber wall is the electrode, the electrode being shorted to the chamber wall by a metal plate.

23. (Amended) A plasma treatment equipment having a chamber for performing plasma treatment, the plasma treatment equipment comprising:  
a plasma excitation electrode to which power for plasma excitation is supplied, the plasma excitation electrode being provided in the chamber;

a susceptor electrode that is opposed to the plasma excitation electrode provided in the chamber; and

an electrode shield of the susceptor electrode provided in the chamber, the electrode shield disposed adjacent to the susceptor electrode,

wherein at least one of the susceptor electrode and the electrode shield thereof has the same DC potential as that of a chamber wall of the chamber,

the susceptor electrode being an electrode into which a high frequency electric current based on the power of plasma excitation flows after passing through a plasma space, and

the chamber wall of the chamber and at least one of the susceptor electrode and the electrode shield thereof are AC shorted to each other.

### **REMARKS**

Claims 1-23 are pending in the application. Claims 1, 13, 14, and 23 have been amended. Claims 2-4, 6-12, and 15-22 remain un-amended. The changes to the amended claims have shown with brackets for deletions and underlines for additions. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

### **OATH/DECLARATION**

The unsigned declaration referred to by the Examiner was not formally submitted. The Applicants filed an application data sheet on June 15, 2006 under 37 CFR §1.76, wherein priority to the foreign applications was asserted.

37 CFR § 1.68 (a) (3) provides that an oath or declaration may be corrected by an application data sheet in accordance with 37 CFR §1.76, where the deficiency or inaccuracy is in failing to meet the requirements of 37 CFR §1.63 (c). In particular, the aspect of a declaration relating to claiming of foreign priority is found in 37 CFR §1.63 (c) (2), and thus the submitted application data sheet obviates the need for a supplemental oath or declaration.

Should a supplementary declaration be needed after a Notice of Allowance has issued, the Applicants undertake to provide such a paper.

### **REJECTION UNDER 35 U.S.C. 251**

Claims 1-23 stand rejected as being based upon a defective reissue

declaration under 35 U.S.C. 251. Applicants respectfully request reconsideration and withdrawal of this rejection based on the reasons as set forth above.

**REJECTIONS UNDER 35 U.S.C. § 102**

Claims 1, 6-10, 13-14, 17-19 and 23 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kawakami et al. (JP 06-333879). Additionally, Claims 1, 6-10, 13-14, 17-19 and 23 were rejected as being anticipated by Sakai et al. (JP 10-032171).

The Applicants respectfully traverse these rejections.

In order to more fully distinguish Applicants' invention, independent Claim 1 has been amended to call for a plasma treatment equipment that has a chamber for performing plasma treatment and includes "a plasma excitation electrode to which power for plasma excitation is supplied, the plasma excitation electrode being provided in the chamber; and a susceptor electrode that is opposed to the plasma excitation electrode provided in the chamber, the susceptor electrode having the same DC potential as that of a chamber wall of the chamber, the susceptor electrode being an electrode into which a high frequency electric current based on the power for plasma excitation flows after passing through a plasma space; wherein the chamber wall of the chamber and the susceptor electrode are AC shorted to each other." Independent Claims 13 and 23 have each been amended in similar fashion. Support for the amendments to independent Claim 1 may be found in, for example, Figure 5 (and corresponding text). Support for the amendments to independent Claim 13 may be found in, for example, Figure 10 (and corresponding text).

Applicants respectfully submit that a minimum, both Kawakami et al. and Sakai et al. fail to disclose or suggest plasma treatment equipment as recited by the independent claims.

With regards to the Kawakami et al. reference, the Examiner has asserted that the lower electrode 8 and lower electrode 12 discloses the recited susceptor electrode. Applicants respectfully note that a more accurate reading of Kawakami et al. reveals that the opposing electrode 6 is grounded and more accurately represents a plasma excitation electrode that receives high frequency power. In other words, Kawakami et al. discloses an earth shield of a plasma excitation electrode that is provided for the purpose of generating plasma in a stabilized manner as opposed to the susceptor electrode distinctly recited by the present invention. Additionally, the Claim 1 has been amended to recite the feature of, "the susceptor electrode being an electrode into which a high frequency electric current based on the power for plasma excitation flows after passing through a plasma space." The Kawakami reference fails to disclose or suggest the direction in which a plasma excitation electric current flows as taught by the present invention. As such, Applicants respectfully submit that Kawakami et al. fails to anticipate Claim 1.

Likewise, Sakai et al. at a minimum fails to disclose or suggest the plasma treatment equipment as called for by the present invention. In Sakai et al., the Examiner points to the cathode electrode 1 of Sakai et al. that includes the top cathode electrode 1a and the bottom cathode electrode 1b and the dielectric 11 to disclose the



the claimed susceptor electrode. Applicants respectfully disagree. Applicants submit that in contrast to the recited susceptor electrode asserted by the Examiner, Sakai et al. actually discloses a cathode electrode, more specifically a "high-frequency excitation electrode" as noted in paragraph 0022 of the reference. Furthermore, the present invention calls for a chamber wall and a susceptor electrode (or a shield of a susceptor electrode) provided at a side area or region into which a plasma excitation electric current flows and which are shorted together. This configuration and structure is clearly not taught or suggested by the cited art.

Additionally, Sakai et al. is not directed to solving the same problems as the present invention which is to reduce impedance downstream of the recited susceptor electrode which is achieved by short-circuiting the chamber wall and the susceptor electrode, thereby enhancing power consumption efficiency. In contrast, Sakai et al. discloses a technique for spreading or diffusing plasma in a chamber in a uniform fashion.

Therefore, Applicants respectfully request that the 35 U.S.C. § 102(b) rejections against independent Claim 1 and its dependent claims be removed. Applicants note that Independent Claims 13 and 23 have been amended to recite similar limitations as independent Claim 1 and, thus, are allowable for at least the same reasons set for above. As such, Applicants respectfully request that the 35 U.S.C. § 103(2) rejections against independent Claims 13 and 23 and their respective dependent claims be removed.

**DOUBLE PATENTING REJECTION**

Claims 1-23 were rejected on the grounds of non-statutory obviousness-type double patenting as being unpatentable over claims 4 and 9 of Nakano. The Applicants continue to believe that the Examiner's rejection on these grounds is misplaced. However, in order to expeditiously conclude the prosecution of this matter, a terminal disclaimer will be submitted, providing that the allowed claims in this application are as currently set forth.

**CONCLUSION**

Claims 1-23 are pending. For at least the reasons given above, the Applicants respectfully submit that the pending claims are allowable, or would be allowable if a terminal disclaimer were to be submitted.

The Examiner is respectfully requested to contact the undersigned in the event that a telephone interview would expedite consideration of the application.

Respectfully submitted,

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